

WHAT IS CLAIMED IS:

1. An internal combustion engine comprising:
an intake valve; and
a variable valve actuation device that is capable of variably controlling lift of
the intake valve so as to change an amount of opening of the intake valve, wherein
5 the variable valve actuation device is adapted to: calculate a first estimated
value of an amount of intake air from a parameter regarding an operation state of the
engine at a time of opening the intake valve; calculate a second estimated value of the
amount of intake air from a parameter regarding the operation state of the engine at a
time of closing the intake valve; and calculate an actual amount of intake air based on
10 the first estimated value and the second estimated value.
2. An internal combustion engine comprising:
an intake valve; and
15 a variable valve actuation device that is capable of variably controlling lift of
the intake valve so as to change an amount of opening of the intake valve, wherein
 the variable valve actuation device is adapted to: calculate a first estimated
value of an amount of intake air from a parameter regarding an operation state of the
engine at a time of opening the intake valve; calculate a second estimated value of the
20 amount of intake air from a parameter regarding the operation state of the engine at a
time of closing the intake valve; calculate a weighting factor that indicates a weight of
the estimated values of the amount of intake air on the actual amount of intake air;
and calculate the actual amount of intake air based on the first estimated value, the
second estimated value and the weighting factor.
- 25 3. The internal combustion engine according to claim 2, wherein the variable
valve actuation device is adapted to calculate the weighting factor, taking into account
a process of change of the parameter regarding the operation state of the engine
during a period from the time of opening the intake valve to the time of closing the
intake valve.
- 30 4. The internal combustion engine according to claim 3, wherein the parameter
regarding the operation state of the engine comprises an amount of change in a
working angle of the intake valve.

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5. The internal combustion engine according to claim 3, wherein the parameter regarding the operation state of the engine comprises an amount of change in a maximum lift of the intake valve.

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6. The internal combustion engine according to claim 3, wherein the parameter regarding the operation state of the engine comprises an amount of change in closing timing of the intake valve.

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7. The internal combustion engine according to claim 3, wherein the parameter regarding the operation state of the engine comprises an amount of change in intake pressure.

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8. A method for calculating intake amount for an internal combustion engine including an intake valve and a variable valve actuation device that is capable of variably controlling lift of the intake valve so as to change an amount of opening of the intake valve, the method comprising the steps of:

calculating a first estimated value of an amount of intake air from a parameter regarding an operation state of the engine at a time of opening the intake valve;

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calculating a second estimated value of the amount of intake air from a parameter regarding the operation state of the engine at a time of closing the intake valve; and

calculating an actual amount of intake air based on the first estimated value and the second estimated value.

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9. A method for calculating intake amount for an internal combustion engine including an intake valve and a variable valve actuation device that is capable of variably controlling lift of the intake valve so as to change an amount of opening of the intake valve, the method comprising the steps of:

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calculating a first estimated value of an amount of intake air from a parameter regarding an operation state of the engine at a time of opening the intake valve;

calculating a second estimated value of the amount of intake air from a parameter regarding the operation state of the engine at a time of closing the intake valve;

calculating a weighting factor that indicates a weight of the estimated values of the amount of intake air on the actual amount of intake air; and

calculating the actual amount of intake air based on the first estimated value, the second estimated value and the weighting factor.

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